

CLAIMS

What is claimed is:

1. A switching fabric based upon a plurality of opto-electrical-physical

5 implementation levels comprising

a first switching fabric having a configuration based on one of the levels of

implementation, and

a second switching fabric, coupled to the first switching fabric, having a

configuration based on one of the levels of implementation compatible with the first

10 network.

2. A switching fabric based upon a plurality of opto-electrical-physical

implementation levels comprising

a first multi-stage network constructed from a recursive 2-stage

15 construction and having a configuration based on one of the levels of implementation, and

a second multi-stage network, coupled to the first network, constructed

from a recursive 2-stage construction and having a configuration based on one of the levels

of implementation compatible with the first network.

3. A switch comprising

$n \times m$  first networks implemented by a recursive 2-stage construction

technique and stacked in  $n$  parallel first planes, each of the first networks having  $m$  outputs,

$m \times n$  second networks implemented by a recursive 2-stage construction

5 technique and stacked in  $m$  parallel second planes orthogonal to the first planes, each of the second networks having  $n$  inputs, and

an interface circuit interposed between the  $n$  first networks and the  $m$

second networks, the interface circuit having:  $m$  input ports in each of  $n$  input planes

parallel with the first planes to cooperatively interconnect with the  $m$  outputs of each of the

10 first networks;  $n$  output ports in each of  $m$  output planes parallel with the second planes to cooperatively interconnect with the  $n$  inputs of each of the second networks; and

interconnections between the  $mn$  input ports and the  $n \times m$  output ports corresponding to a pre-determined exchange.

15 4. The switching fabric as recited in claim 3 wherein the pre-determined exchange corresponds to an output exchange relative to the first networks.

5. The switching fabric as recited in claim 3 wherein the pre-determined exchange

corresponds to an input exchange relative to the second networks.

6. The switching fabric as recited in claim 3 wherein the pre-determined exchange corresponds to an output exchange relative to the first networks as well as an input

5 exchange relative to the second networks.

7. A switching fabric comprising

a plurality of first networks based on a first multi-stage network constructed from a recursive 2-stage construction technique,

10 a plurality of second networks based on a second multi-stage network constructed from the recursive 2-stage construction technique with reference to the plurality of first networks, and

an interface circuit, interposed between the plurality of first networks and the plurality of second networks to cooperatively interconnect the plurality of first

15 networks with the plurality of second networks with interconnections corresponding to a pre-determined exchange.

8. A switching fabric comprising

n first  $m \times m$  networks based on a first multi-stage network constructed from a recursive 2-stage construction technique, the first networks being stacked in n parallel first planes, each of the first networks having m outputs,

- 5 m second  $n \times n$  networks based on a second multi-stage network constructed from the recursive 2-stage construction technique with reference to the first networks, the second networks being stacked in m parallel second planes, each of the second networks having n outputs, and

- an interface circuit interposed between the n first networks and the m second networks, the interface circuit having: m input ports in each of n input planes parallel with the first planes to cooperatively interconnect with the m outputs of each of the first networks; n output ports in each of m output planes parallel with the second planes to cooperatively interconnect with the n inputs of each of the second networks; and interconnections between the  $mn$  input ports and the  $nm$  output ports corresponding to a pre-determined exchange.
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